Oil and Gas, Natural Resources, and Energy Journal

Volume 7 | Number 4

August 2022

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Recommended Citation

Amandeep Kaur, *Batteries + Storage: The Implications of Integrating a Battery Energy Storage System into Renewable Energy Power Purchase Agreements*, 7 OIL & GAS, NAT. RESOURCES & ENERGY J. 911 (2022), https://digitalcommons.law.ou.edu/onej/vol7/iss4/5

ONE J

Oil and Gas, Natural Resources, and Energy Journal

VOLUME 7 NUMBER 4

BATTERIES + STORAGE: THE IMPLICATIONS OF INTEGRATING A BATTERY ENERGY STORAGE SYSTEM INTO RENEWABLE ENERGY POWER PURCHASE AGREEMENTS

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* University of Oklahoma College of Law, JD Candidate 2023. I would like to thank my parents, Baldish Kaur and Guldeep Singh, for their constant support and encouragement in all my endeavors. I would also like to express my gratitude to Professor M. Alexander Pearl and the ONE-J Editorial Board for their guidance through the writing process.

I. Introduction

You're currently drafting a power purchasing agreement to secure renewable energy from a Texas-based wind farm after the Board approved contracting with them as part of the company's campaign toward becoming *greener*. The deal was originally held up over concerns from many members of the Board regarding where the company would get energy if the wind stopped blowing. But the energy company managed to convince them by informing them about a piece of technology called a battery energy storage system. These battery energy storage systems have the ability to store renewable energy to be used at times when the source of renewable energy production is unavailable, i.e., the wind stops blowing. This technology satisfied the Board and the deal moved forward. So, as you're drafting the power purchase agreement, you make sure to pencil in a battery energy storage system into the budget and move on to more important details.

This is a flaw that many attorneys make when contracting with renewable energy companies where a battery energy storage system is included in the terms. They think it's as simple as just adding another line to the budget or supplies list. However, there is much more consideration that needs to be given to the integration of a battery energy storage system.

As environmental protection agencies and the legislature seek new solutions to preserve the planet, one route that many large companies are taking is making a switch to utilizing renewable energy sources to meet part or most of their energy needs. Now more than ever, corporations are looking toward renewable energy to become their primary method of energy consumption. To procure adequate energy supplies, companies generally enter power purchasing agreements with energy producers who can meet these consumer demands. Long-standing rules governing these purchase agreements outline the requirements of the energy exchange transaction, including the prices, intervals of delivery, and various other stipulations.

Traditionally, renewable energy has been difficult to store. However, with technological advances, new methods of storing and reproducing energy are becoming prevalent, such as the development of battery energy storage systems. These systems allow for renewable energy to be stored while renewable resources are abundant, so that the energy can be reproduced at times when said sources are depleted. And although energy storage has been used to store conventional energy, the introduction of renewable energy storage will play a large role in replacing fossil fuels-based energy consumption in the future. Although there is a plethora of knowledge on drafting a traditional purchasing agreement, legal professionals neither have a traditional template nor proper instructions on all the elements that need to be taken into consideration when drafting power purchasing agreements that include battery energy storage systems. With the increasing demand to integrate such systems into purchasing agreements, attorneys must consider various other issues that alter the traditional model.

The purpose of this article is to point out the shortcomings of the traditional power purchase agreement in the face of renewable energy storage and highlight purposed factors that attorneys need to consider when adding a energy storage system in a renewable energy purchasing agreement.

Sections II-IV work to lay the foundation needed to fully understand the depth of the issues to be discussed. Section II of the article provides a background on environmental issues that have encouraged the development of renewable energy and lays a foundation for its need and uses. Section III provides an in-depth explanation of a battery energy storage system and the various concerns associated with these systems that must be given consideration. Section IV focuses on outlining the traditional power purchase agreement and the elements that normally get incorporated in this document. Section V will then explore the various other issues that need to be given consideration when integrating battery energy storage systems into power purchase agreements.

II. Background

A. Environmental Concerns

Before getting into the depths of renewable energy purchasing agreements, we must first establish a foundational understanding of where the renewable industry began and why it has garnered such significance. The importance of renewable energy stems from the depleting natural resources and the detrimental effects that fossil fuels have caused the earth.

The United States Environmental Protection Agency (EPA) reports that since the industrial revolution, large amounts of carbon dioxide and other greenhouse gas emissions have changed Earth's climate, not only affecting temperatures but also altering natural processes.[1] The rise in the release of carbon dioxide, methane, and nitrous oxide has increased the greenhouse effect and raised Earth's temperature, with the burning of fossil fuels impacting this change more than any other human activity.[2]

Fossil fuels form from decomposed carbon-based organisms that died millions of years ago, which create carbon-rich deposits that are extracted and burned for energy.[3] Although these sources are non-renewable, they currently supply around 80% of the world's energy.[4] Fossil fuels fall into three main categories: coal, oil, and gas.[5] And these fossil fuels are currently used in all means of production, from being used for electricity and running cars, to being made into plastic, steel, and other products.[6] The detrimental effect of using fossil fuels is not only the effective loss of these fossil fuels due to overconsumption but also that when they are burned, they release large amounts of carbon dioxide into the air.[7] This excess

1. *Causes of Climate Change*, Environmental Protection Agency (last visited Oct. 14, 2021), https://www.epa.gov/climatechange-science/causes-climate-change. (Ex: Such as changes in the sun's energy and volcanic eruptions).
2. *Id*.
3. *Fossil fuels and climate change: the facts,* ClientEarth (Nov. 11, 2020), https://www.clientearth.org/latest/latest-updates/stories/fossil-fuels-and-climate-change-the-facts/.
4. *Id*.
5. *Id*.
6. *Id*.
7. *Id*.

burning releases greenhouse gases that trap heat in our atmosphere and alter the earth's natural processes.[8]

An increase in greenhouse gases possess greater issues of global warming, and "risks further sea-level rise, extreme weather, biodiversity loss and species extinction, as well as food scarcity, [and] worsening health and poverty for millions of people worldwide."[9] The Intergovernmental Panel on Climate Change (IPCC) has found that emissions from fossil fuels are the dominant cause of global warming, with coal being the single largest source of global temperature rise.[10] These issues are what paved the way for a greater need for renewable energy production.

B. A Need for Renewable Energy

Renewable energy, or clean energy, is energy that "comes from natural sources or processes that are constantly replenished."[11] While renewable energy has been in use since the beginning of time – *think the wind that helped boats sail* – the industrial movement looked to fossil fuels as the cheaper and more easily accessible energy source. But, as technology becomes more advanced, renewable energy is becoming increasingly easier to capture and use, prime examples being solar and wind energy projects. Renewable energy is thus "increasingly displacing 'dirty' fossil fuels in the power sector, offering the benefit of lower emissions of carbon and other types of pollution."[12]

The United States Energy Information Administration reports that approximately 12% of the current United States energy consumption is provided by renewables almost exclusively within five major categories: Biomass (from plants), Hydropower (from flowing water), Geothermal (from the heat inside the earth), Solar (from the sun), and Wind (from the motion of air).[13] Producing and using clean energy reduces the amount of fuel needed to generate electricity, as well as the number of greenhouse

8. *Id*.

9. *Id*.

10. *Id*.

11. Lora Shinn, *Renewable Energy: The Clean Facts*, NRDC (June 15, 2018), https://www.nrdc.org/stories/renewable-energy-clean-facts. ("For example, sunlight or wind keep shining and blowing, even if their availability depends on time and weather.")

12. *Id*.

13. *What is energy?*, U.S. Environmental Information Administration (May 7, 2021), https://www.epa.gov/climatechange-science/causes-climate-change.

gases and other air pollution released as a result.[14] More meaningfully, electricity from renewable resources "does not contribute to climate change or local air pollution since no fuels are combusted."[15]

The emphasis on promoting renewable energy comes from multiple branches of power. Environmental protection agencies are working harder to highlight conditions that are deteriorating the planet while simultaneously lobbying various governmental agencies to take protective measures and implement eco-friendly policies. In the past decades, the presidential administrations have also placed environmental issues at the forefront of many campaign policies, promoting legislative changes and incentives to encourage companies to pursue environmentally friendly alternatives for many of their activities.

There are many benefits of renewable energy that stakeholders recognize, "including diversifying the sources of US energy to reduce its dependency on fossil fuels generally and foreign oil imports in particular."[16] The federal government provides many tax breaks and advantages to oil and gas companies to promote exploration, extraction, and other related activities that affectively work to decrease our carbon footprint, "the Biden administration has also expressed a commitment to reduce the US carbon footprint and the use of fossil fuels."[17]

Between its various agencies and departments, including the Department of Energy, Agriculture, Commerce, Defense, Treasury, and Interior, the federal government has implemented many renewable energy-related initiatives that benefit investors, project developers, and energy producers, including federal income tax credits**.**[18] These federal tax credits, the production tax credit (PTC) and the investment tax credit (ITC), "reduce the tax liability of renewable project owners and investors."[19] Many renewable energy projects depend on federal tax incentives (the PTC and the ITC) to make such projects profitable.[20]

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14. *Learn about Energy and its Impact on the Environment*, Environmental Protection Agency (last visited Oct. 14, 2021), https://www.epa.gov/energy/learn-about-energy-and-its-impact-environment.

15. *Id*.

16. .*Renewable Energy: Overview (US)*, Practical Law Practice Note Overview 4-518-1338 (2021).

17. *Id*.

18. *Id*.

19. *Id*.

20. *Introduction to Renewable Energy Power Purchase Agreements*, Practical Law Practice Note 4-532-3248 (Westlaw) (last visited Jan. 14, 2022).

The PTC is "based on the amount energy actually produced by qualifying renewable energy projects" and "provides a ten-year inflation adjusted tax credit per kWh [kilowatt/hour] of energy produced."[21] Alternatively, the ITC is "based on the amount invested in a qualifying renewable energy project," and "under current law (26 U.S.C. § 48, as amended by PL 114-113, December 18, 2015, 129 Sta. 2242), the amount of this credit varies depending on when a project begins construction."[22] The cost associated with constructing and operating these projects would be too high for many project developers without these tax credits, making it difficult for them to obtain power purchase agreements at prices sufficient to offset these costs and generate a return.[23] The allocation of tax incentives is one issue that will be discussed in further detail later, but something that should be kept mindful by all parties involved in a renewable energy contract.

C. Issues with Renewable Energy

With such incentives and many groups pushing toward the use of renewable energy, the greatest drawback to it is simply that renewable energy cannot be produced on demand *to a certain degree*. For example, wind energy will only be produced when it is windy and solar energy when it is sunny. This type of variability in renewable energy can have a detrimental impact on generators, "which experience steeper ramps, deeper turn downs, and shorter peaks in system operations."[24] Therefore, "[the] inability to accurately predict the power demand and/or generator output, which can be affected either by unexpected outages or by the unpredictability of the resource," has proved to be an area of concern for renewable energy experts as they look toward optimum methods to store energy for most efficient use.[25]

Operational flexibility refers to the ability of a power system to respond to these changes.[26] Operational flexibility allows a power system to change its electricity demand and generation, which is particularly important for systems that generate "high levels of solar and wind, whose power outputs

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21. *Renewable Energy: Overview (US)*, *supra* note 16.
22. *Id*.
23. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.
24. *Sources of Operational Flexibility*, NREL (May, 2015), https://www.nrel.gov/docs/fy15osti/63039.pdf.
25. *Id*.
26. *Id*.

can be variable and uncertain, creating a fluctuating supply."[27] Operational flexibility is the cornerstone of much modern renewable energy machinery.

As the movement to reduce the world's carbon footprint grows, the expansion of the renewable energy industry has paved the way for more focus to be placed on energy storage. Electricity grids have proved to be one method of storing energy. These grids are designed to address these variability issues in electricity demand by maintaining a continuous balance between production, demand, and energy reserves for any type of outage on the system, like a power plant failure.[28] These grids allow energy producers to obtain power from renewable energy during periods of production, "[like] when the sun is shining, the water is running, or the wind is blowing."[29] The remaining produced energy is then fed back into the grid.[30] Then, when renewable resources are not presentably available to be generated, "electricity from the grid supplies [ ] needs."[31] Thus, the energy stored in the grid is then released to meet energy demands.

Although electricity grids have proven increasingly beneficial for energy storage, as the renewables industry continues to develop, these grids must be modified to integrate larger amounts of energy and "address the additional variability that comes with heavier reliance on renewables."[32] To effectively resolve such issues and as the energy industry moves toward greater utilization of renewable energy, better and more viable methods to create and then store energy are becoming prominent.

III. Battery Energy Storage Systems

Energy storage is not new or revolutionary; it has been used effectively and efficiently in the industry for many years. Energy storage facilitates are fluid mechanisms and their effectiveness is determined by "how quickly it can react to changes in demand, the rate of energy lost in the storage process, its overall energy storage capacity, and how quickly it can be

27. *Id*.

28. Susan Tierney and Lori Bird, *Setting the Record Straight About Renewable Energy*, World Resource Institute (May 12, 2020), https://www.wri.org/insights/setting-record-straight-about-renewable-energy.

29. *Grid-Connected Renewable Energy Systems*, Energy.Gov (last visited Oct. 14, 2021), https://www.energy.gov/energysaver/grid-connected-renewable-energy-systems.

30. *Id*.

31. *Id*.

32. Tierney & Bird, *supra* note 28.

recharged."[33] Energy storage has also proved useful in meeting demands during peak usage times as electricity becomes more expensive due to over-usage in these periods. For example, during hot summer days when air conditioners are blasting, electricity becomes more expensive because power plants have to ramp up production to accommodate the increased usage.[34] Distributors can buy electricity during off-peak seasons when energy is cheap and then sell it when it is in greater demand, permitting energy storage to have more grid flexibility.[35] This also proves "[energy storage] resilience since it can serve as a backup energy supply when power plant generation is interrupted."[36]

However, renewable energy storage is relatively uncharted as producers and consumers look for the latest methods to store renewable energy to be utilized when it cannot be generated on demand. As renewables become the more prominent method for producing energy, there is a growing need for systems that can store clean energy.[37]

A. What Is a Battery Energy Storage System?

As the production of renewable energy increases, ways to effectively store and reproduce that energy are on the rise. A Battery Energy Storage System (BESS) allows renewable energy to be stored and released when customers need it the most.[38] A BESS is a device that can "charge or store electricity during periods of high energy supply and low demand and then release that electricity when it is most needed (during periods of low supply and high demand)."[39] A BESS is charged by electricity generated from renewables, with particular software inside of the battery that coordinates energy production.[40] Control systems in the battery then determine when to "keep the energy to provide reserves or release it to the grid,"

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33. Alexandra Zablocki, *Fact Sheet | Energy Storage*, EESI (February 22, 2019), https://www.eesi.org/papers/view/energy-storage-2019.

34. *Id*.

35. *Id*.

36. *Id*.

37. *Id*.

38. *What is battery storage?,* National Grid (last visited Oct. 14, 2021), https://www.nationalgrid.com/stories/energy-explained/what-is-battery-storage.

39. *Battery Energy Storage Systems (BESS)*, Resource ID W-032-1319, Westlaw https://www.westlaw.com/w-032-1319?transitiontype=default&contextdata=(sc.default)&vr=3.0&rs=cblt1.0 (last visited Nov. 21, 2021).

40. *What is battery storage?*, *supra* note 38.

effectively releasing energy from the system during times of demand, thereby helping keep the costs down and electricity flowing.[41]

A BESS enables "project developers to exploit wind and sunlight when they are available by allowing energy produced by these projects to be stored and used at a later date," and thereby address the issues of seasonality and intermittency, "the main criticisms of wind and solar energy sources."[42] "BESS can also be used to provide backup capacity to ensure electric grid reliability and resilience," and these systems can "either be built on a standalone basis to charge from the power grid or as a co-located system that charges directly from a generator."[43]

1. Benefits of BESS Technology

Because a BESS contains advanced technology, it can perform tasks that regular batteries are not able to, for both commercial and residential uses.[44] A predominant application of a BESS for commercial usage is peak shaving, where the BESS "guarantees that no power above a predetermined threshold will be drawn from the grid during peak times."[45] This is highly effective for businesses where demand charges are between 30-70%.[46] A solar array is not sufficient to generate that demand energy, but a BESS allows for solar and stored energy to work in conjunction with one another to both fulfill demand and drop commercial utility bills to almost zero.[47]

Other prominent functions of a BESS include load shifting, which allows for a shift in energy usage by charging the batteries and storing energy when electricity is cheapest, and then discharging batteries when costs are higher, allowing for emergency backup storage.[48] BESSs also pave the possibility of establishing microgrids in conjunction with renewables.[49] Microgrids are a "self-sufficient energy system that serves a discrete geographic footprint, such as a college

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41. *Id*.
42. *Battery Energy Storage Systems (BESS), supra* note 39.
43. *Id*.
44. *How Battery Energy Storage Works*, Ideal Energy Solar (Last visited Oct. 15, 2021), https://www.idealenergysolar.com/how-battery-energy-storage-works/.
45. *Id*.
46. *Id*.
47. *Id*.
48. *Id*.
49. *Id*.

campus, hospital complex, business center, or neighborhood."[50] Most significantly, a BESS also allows for renewable integration by allowing "solar energy production to mimic the consistency of fossil fuel energy sources."[51]

BESSs contain several components to ensure competent storage capabilities, allowing them to be more than mere batteries. Each contains swappable battery modules which can be traded out with no downtime to ensure that the entire storage unit does not stop due to a single battery failure.[52] Further, onboard sensors help maintain appropriate operating temperatures, while control components allow systems to be set up in the manner most effective to perform their functions without needing ongoing user intervention.[53]

Further, a BESS provides both resiliency and reliability. "Resiliency encompasses consequences to the electricity system and other critical infrastructure from high-impact external events whose likelihood was historically low but is now increasing."[54] While the reliability of BESS allows it to reduce outages and maximize 24-hour operations.[55] These BESSs are starting to be the next big thing in the energy industry to help optimize the use of renewables as the primary form of energy consumption. However, the technology behind these BESSs is still a work in progress.

2. Lithium Batteries

One type of BESS is the lithium-ion battery. As the costs associated with renewable energy products and machinery have "reached [an] all-time lows," concern regarding the optimum way to store that energy for times of

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50. Elisa Wood, *What is a Microgrid?*, Microgrid Knowledge (Mar. 28, 2020), https://microgridknowledge.com/microgrid-defined/.

51. *How Battery Energy Storage Works*, *supra* note 44.

52. *Id*.

53. *Id*. ("For example, batteries can be configured to charge automatically when energy is cheapest and discharge automatically when it's most expensive, or they can be configured to simply store energy in case of a power outage.").

54. Scott Sklar, Brett Simon, and Renée Guillory, *Better Buildings Residential Network Peer Exchange Call Series: The Next Frontier: Energy Storage and Batteries*, Energy.gov (March 28, 2019), https://www.energy.gov/sites/default/files/2019/07/f64/bbrn-energy-storage-batteries-032819.pdf.

55. *Id*.

low production has increased.[56] "The go-to option right now is lithium-ion batteries."[57] "Most battery storage systems currently installed in the US are lithium-ion batteries, but other battery technologies are being explored and developed."[58]

Lithium-ion batteries are an "advanced battery technology that uses lithium ions as a key component of its electrochemistry," where during a discharge cycle, "the lithium ions move from the anode and pass through the electrolyte until they reach the cathode, where they recombine with their electrons and electrically neutralize."[59] This neutralization allows for the storage of energy power.[60] Because of lithium's small size, these batteries "are capable of having a very high voltage and charge storage per unit mass and unit volume."[61] Lithium batteries prove particularly efficient in their storage capability, "[the] high energy density of lithium ions enables a compact battery to pack a lot of power, while their ability to handle a high number of cycles makes them suitable for recharging."[62] Additionally, they have higher energy densities than any other battery today and can deliver up to 3.6 Volts, which is three times higher than most other technologies.[63] Lithium batteries also have low self-discharge rates.[64]

3. Safety Concerns with BESS

Battery storage facilities and therefore attorneys drafting agreements regulating the use of a BESS must consider certain limitations of battery storage systems, with a primary concern being maintaining safety standards. Some of the precautions that are encouraged are that these batteries be kept in a battery room, away from heavy traffic areas, or behind a barrier that would prevent people from accidentally coming into contact

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56. Katie Brigham, *These new battery technologies could be the future of energy storage*, CNBC (Mar. 14, 2020), https://www.cnbc.com/2020/03/13/lithium-ion-batteries-heres-whats-coming-to-replace-them.html.

57. *Id*.

58. *Battery Energy Storage Systems (BESS)*, *supra* note 39.

59. *Lithium-Ion Battery*, Clean Energy institute (Last visited Oct. 15, 2021), https://www.cei.washington.edu/education/science-of-solar/battery-technology/.

60. *Id*.

61. *Id*.

62. *Lithium-Ion Battery Storage Requirements*, US Chemical Storage (February 26, 2020), https://www.uschemicalstorage.com/lithium-ion-battery-storage-requirements/.

63. *Lithium-Ion Battery*, *supra* note 59.

64. *Id*.

with them.[65] Because these batteries continuously give off fumes and gases that can be hazardous to health, any such barriers must also have proper ventilation at all times.[66] Further, these storage facilities should be monitored and checked periodically to control for safety, particularly for fire safety.

The drawbacks of using lithium-ion batteries are prevalent to the point of concern for many experts. Although the price of lithium batteries has been dropping, "experts say it will remain too expensive for most grid-scale applications." Furthermore, the practicality of utilizing a lithium-based energy storage system is juxtaposed with the very reasoning behind why energy storage is necessary: to store renewable energy when it is not possible to generate it on demand. Currently, lithium-ion batteries "can't store more than four hours' worth of energy at a price point that would make sense."[67]

Additionally, lithium-ion batteries pose a significant fire risk, and their ability to hold a charge fade over time.[68] The Code of Federal Regulations Title 49, section 173.185 highlights important management regulations for lithium battery transportation due to the hazardous nature of the chemical.[69] Although lithium batteries are now predominantly being used as an accessible source for battery storage, the long-term utilization of lithium possess significant dangers and is highly unlikely.

B. Limited Current Regulations on Battery Storage

Although there is a general lack of laws relating to renewable energy storage, 2020 End of Year regulations highlight a push in legislature to develop innovative energy storage projects. 42 United States Code, section 17232 highlights meticulous guidelines for battery storage technology, as well as recommends research, development, and deployment of storage projects, and testing.[70] The primary objectives of this program, as highlighted in 42 U.S.C.A. § 17232 (c)(2)(D), includes, but is not limited to, improving the security of critical infrastructure, improving the reliability of transmission and distribution systems, supplying energy at peak periods of demand on the electric grid or during periods of significant variation of

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65. Jessica Jewell, *Kitchen Audit Checklist*, Legal Beagle (Last visited Oct. 15, 2021), https://legalbeagle.com/13661688-osha-battery-storage-requirements.html.

66. *Id*.

67. Brigham, *supra* note 56.

68. *Id*.

69. *See* 49 C.F.R. § 173.185.

70. *See* 42 U.S.C.A. § 17232.

electric grid supply, and to improve energy efficiency.[71] These guidelines provide structure for what the future of energy storage could encompass.

42 U.S.C.A. § 17233 highlights the energy storage technology and microgrid assistance program under which the Secretary will provide grants and technical assistance and will disseminate information to eligible entities for "identifying, evaluating, designing, and demonstrating energy storage technology and microgrid projects that utilize energy from renewable energy sources," and "to conduct feasibility studies to assess the potential for implementation or improvement of energy storage technology or microgrid projects."[72]

Today, only a few state legislatures have opted to define and regulate specific renewable energy battery storage systems. Colorado's Energy Technologies regulations outline the effective use of clean energy, stating that "the commission shall give the fullest possible consideration to the cost-effective implementation of new clean energy and energy-efficient technologies," specifically due to "the beneficial contributions such technologies make to Colorado's energy security, economic prosperity, insulation from fuel price increases, and environmental protection, including risk mitigation in areas of high wildfire risk as designated by the state forest service."[73] In subsection 2 of the provision, the regulation states that:

> [the] commission shall consider proposals by Colorado investor-owned utilities for the following types of projects: (I) To construct, own, and operate electric generation or storage facilities utilizing innovative energy technology; or (II) To partner with other energy developers or independent power producers to construct, acquire, or contract for electric generation or storage facilities utilizing innovative energy technology.[74]

Rather than provide stringent guidelines for attorneys to follow when assessing the integration of a BESS, this Colorado provision allows the industry to look toward innovative mechanisms for energy storage, thereby opening a gateway to discrepancy into the proper regulation of this "innovative" energy and the storage facilities.

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71. *Id*.
72. 42 U.S.C.A. § 17233.
73. CO. ST. § 40-2-123.
74. *Id*.

IV. Power Purchase Agreements

Although battery storage and renewable energy individually are governed by comprehensive laws, the cross-section of battery storage specifically for renewable energy storage has chartered lawmakers into unknown territory. Historically, there is a general lack of renewable energy storage regulations within the United States. Between the end of 2014 to March 2019, "utility-scale battery capacity in the United States quadrupled . . . [and] it is projected to more than double by 2023, according to the U.S. Energy Information Administration (EIA)."[75] As the energy industry is expanding, attorneys are continuously faced with novel issues as they navigate through the implications of adding a BESS into contractual agreements.

Corporate attorneys see these issues on the rise in energy deals due to more battery energy storage systems being pre-included in negotiations. "Too often, a battery is seen as simply another line item in a budget that can be priced like another piece of equipment added to a generating facility, [b]ut it's much more than that."[76] Both parties often do not know the correct approach to incorporate the system adequately for their respective clients. With a lack of law, regulations, and precedent to explain effective methods to integrate battery energy storage systems into deals, attorneys are forced to tread unfamiliar territory as they attempt to overcome this issue.

A. The Traditional PPA

As many corporations look toward procuring renewable energy as a key part of reducing their carbon footprints, they often contract with power utility companies for access to this energy. The traditional approach to contract for energy supply is through a Power Purchase Agreement (PPA). Since most "non-power companies don't want to take on the responsibility of constructing and operating their own wind or solar farms, they turn to [PPAs] to source renewable energy."[77]

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75. *Clearer Expectations Over Energy Storage needed in Utility-Scale Project Contract Negotiations*, JDSUPRA (October 8, 2019), https://www.jdsupra.com/legalnews/clearer-expectations-over-energy-36784/.

76. *Id*.

77. Aaron Larson, *Types of Power Purchase Agreements and Why Each PPA Might Be Used*, Power (Sep. 1, 2021), https://www.powermag.com/types-of-power-purchase-agreements-and-why-each-ppa-might-be-used/.

A PPA "is a long-term contract under which a business agrees to purchase electricity directly from a renewable energy generator."[78] Generally, the traditional PPA provides "the owner of a power plant with a stable and long-term contracted revenue stream that allows the owner to recoup the costs of developing, constructing and financing the plant and to earn a return on the owner's equity investment."[79] The PPA will give the buyer of the plant's output a long-term contractual basis "to secure access to the electricity the buyer needs to meet its obligations," and also enables "the owner of the project to secure project financing by providing financing parties with a stable revenue source that will be used to repay debt and earn a return on equity."[80]

Simply, a PPA is an agreement between two parties for the purchase of a specific type of energy for a prolonged period. PPAs outline the terms and conditions that control how electricity produced by a specific power plant is sold.[81] The agreements outline a generic set of information describing the type of exchange to occur, including the rights and obligations of the seller and the buyer, setting out remedies, "including liquidated damages for non-performance and termination rights," allocating risks related to the construction between the parties (in the case of a new power plant), and general terms of operation for the power plant (including supply and delivery, performance, regulatory and credit risks).[82] Generally, PPAs serve a term of 10 to 20 years and provide all details relating to the commercial requirements of the renewable energy sale between parties, "including when the project will begin commercial operation, a schedule for delivery of electricity, penalties for under delivery, payment terms, and termination conditions."[83]

1. Corporate PPA

This article focuses solely on corporate PPAs. "In corporate renewable energy PPAs, the "seller" is often the developer or project owner, [and] the "buyer" (often called the "offtaker") is the commercial and industrial (C&I)

78. *Power Purchase Agreement*, RWE (last visited Nov. 13, 2021), https://www.rwe.com/en/our-portfolio/our-products/power-purchase-agreement/?dateFrom=13.11.2021&dateTo=13.12.2022&list1=*.

79. *Power Purchase Agreements: Key Issues and Provisions*, Practical Law Practice Note 6-522-4469 (last visited Jan. 10, 2022).

80. *Id.*

81. *Id.*

82. *Id.*

83. Larson, *supra* note 77.

entity."[84] The seller under a corporate PPA is typically an independent power producer (IPP), "an entity that owns or operates electricity generation assets."[85] The seller or IPP performs a variety of roles which include "develop[ing] and hold[ing] the power plant assets, including land rights, improvements, environmental permits and licenses" and "enter[ing] into the necessary commercial agreements related to the development, ownership and operation of the project, including the PPA, the supply agreements, the construction agreement, the operation and maintenance agreement and the project loan documents,"[86] The seller also issues "equity and incur[s] the debt required to develop, construct, own and operate the project."[87]

Alternatively, the buyer "under a PPA is often an electric utility but could also be a power marketer (an entity (often a trading company) engaged in the purchase and sale of electricity[88])."[89] The buyer enters the PPAs "to acquire energy and/or capacity to meet their retail load requirements as an alternative to self-build generation."[90] Increasingly, in renewable energy projects, these buyers are corporations and industrial entities such as Google, Walmart, and Apple.[91]

2. Requirements of a PPA

When sourcing renewable energy for their business, C&I corporations must consider whether to pursue an on-site or off-site system, which is "usually driven by the load or demand the company is looking to fill." On-site systems are generally smaller (often in the 500 kW to 3 MW range) and include equipment such as rooftop solar panels or small wind turbines. For C&I companies that have larger needs, off-site systems are usually required.[92] Modern C&I entities have "wider, easier access to a broad array of large-scale direct renewable energy procurement options and [are]

84. *Renewable energy power purchase agreements*, 3Degree (Feb. 5, 2018), https://3degreesinc.com/resources/ppas-power-purchase-agreements/.

85. *Power Purchase Agreements: Key Issues and Provisions, supra* note 79.

86. *Id*.

87. *Id*.

88. Power Marketer, Resource ID 6-521-0014, Westlaw https://us.practicallaw.thomsonreuters.com/6-521-0014 (last visited Dec. 22, 2021).

89. *Power Purchase Agreements: Key Issues and Provisions*, *supra* note 79.

90. *Id*.

91. *Id*.

92. Larson, *supra* note 77.

implementing on-site [ ] and off-site PPAs at a record-breaking pace."[93] Such agreements permit renewable energy into existing infrastructure, either directly to the company or via utility companies, "providing a stable source of income for new renewable projects that can offset capex costs, and encouraging future renewable projects to develop within a financially stable framework."[94]

Generally, all PPAs include provisions relating to (1) "the date on which electricity delivery must begin"; (2) "[i]n the case of new projects, performance or construction milestones to track the progress of the project and its compliance with any agreed operating and performance guidelines"; (3) the "amount of electricity that must be delivered or purchased"; (4) the "price at which the electricity is to be sold"; (5) events of default and remedies; and (6) "[c]redit support obligations, including guarantees and letters of credit."[95]

However, a renewable energy PPA will vary according to the type of renewable source that is producing the energy and the type of corporation that the energy is needed for. Renewable energy PPAs for grid-connected power plants are most comparable to PPAs for fossil fuel-based power plants, although renewable PPAs additionally address issues not applicable to fossil fuel PPAs, "such as the ownership, sale, and transfer of [renewable energy certificates]; minimum guaranteed output (as opposed to guaranteed availability) obligations on the part of the seller; and must take (or as available) obligations on the part of the buyer."[96] Corporate PPAs come in two primary structures: Physical PPAs and Virtual PPAs.

a) Physical PPAs

Physical PPAs comprise a corporate off-taker that enters into a 10 to 15-year term PPA with a renewable energy generator "to take some or all of the energy generated by its plant (or portfolio of plants) with a defined amount of power sold at a fixed price per MWh."[97] In these types of contracts, the buyer will contract with the seller to have the power delivered

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93. *Renewable energy power purchase agreements*, 3Degree (Feb. 5, 2018), https://3degreesinc.com/resources/ppas-power-purchase-agreements/.

94. *Power of the PPA: the risks and rewards of buying energy at source*, Power-Technology (Jan. 9, 2020), https://www.power-technology.com/features/power-of-the-ppa-the-risks-and-rewards-of-buying-energy-at-source/.

95. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.

96. *Power Purchase Agreements: Key Issues and Provisions*, *supra* note 79.

97. Natasha Luther-Jones, *Corporate Power Purchase Agreements (PPAs): What are they?*, DLA Piper (Nov. 12, 2019), https://www.dlapiper.com/en/us/insights/publications/2019/11/what-are-corporate-power-purchase-agreements-ppa/.

via a power grid.[98] These types of PPAs also contain provisions for the "sale and purchase of electricity and the allocation of any applicable renewable energy benefits (such as green certificates), and all [other] provisions governing that sale and purchase."[99] In many cases, this also includes obligations "to provide or procure certain metering and regulatory activities that can only be undertaken by licensed electricity suppliers."[100] Physical PPAs "have been the leading form since the birth of the corporate renewable energy market."[101] A physical PPA, the more traditional option, implicates a "long-term agreement between a corporate customer, energy supplier and renewable electricity generator," where the "supplier will build, own and maintain the project while selling electricity back to the customer at a fixed price per unit (dollars per megawatt-hour)."[102] The electricity generator will facilitate the physical delivery of power to buyers.[103] Through a process called "sleeve-ing," "an intermediary utility company handles the transfer of money and energy to and from a renewable energy project on behalf of the buyer," and the "utility takes the energy directly from the [renewable energy] project and 'sleeves' it to the buyer at its point of intake, for a fee."[104] And as such, this "physical transfer of electricity from renewable energy developers to buyers through an intermediary utility company sets [physical PPAs] apart from virtual ones."[105]

Simply, this method means that the buyer has to deal with the variability of the power plant's ability to produce the amount of energy needed to match the buyer's power consumption.[106] This creates risk for the "power marketer whose trading teams will be responsible for balancing the power volumes."[107] Further, "[the] terms of supply under this supply agreement

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98. Joan Collell, *Physical PPA Vs. Virtual PPA Agreement: How to Choose a PPA*, Flexidao (Mar. 31, 2021), https://www.flexidao.com/post/virtual-ppa-agreement-vs-physical-ppa.

99. Luther-Jones, *supra* note 97.

100. *Id*.

101. Natalie Gregus, *2 Types of Power Purchase Agreements (PPAs) Your Corporation Could Benefit From*, Energy Link (Sep. 7, 2021), https://goenergylink.com/blog/types-of-power-purchase-agreements/.

102. *Id*.

103. *Id*.

104. *What is a Sleeved PPA?*, Urban Grid (Apr. 22, 2019), https://www.urbangridsolar.com/what-is-a-sleeved-ppa/.

105. Gregus, *supra* note 101.

106. Collell, *supra* note 98.

107. *Id*.

will [need to] take into account the electricity purchased under the PPA and passed through to the licensed supplier under the licensed supplier agreement."[108] Ultimately this method "ensures that the [buyer] has the benefit of the fixed pricing for renewable energy under the PPA but the reliability of a supply agreement with a licensed electricity supplier to meet its day-to-day energy demands."[109] Additionally, "[if] the purchased renewable energy isn't enough to meet the buyer's energy needs, the utility is also responsible for supplying the additional power required."[110]

b) Virtual PPAs

Virtual, or synthetic, PPAs "are newer to the market and have gained popularity in the past few years," but "some would argue that they are the fastest-growing funding structure."[111] A Virtual PPA "involves a corporation and a developer with the goals of allowing corporations to meet their sustainability target and facilitating decarbonization across the grid."[112] In Virtual PPAs, no electricity is physically traded.[113] Rather, "the agreement functions with a derivative contract structure where the [buyer] and [seller] agree [to] a defined 'strike price' for power generated by a renewable energy facility."[114] With a virtual PPA, "the developer sets a fixed price for each unit of electricity produced over a specified time period and sells these units to local power grids," in exchange for renewable energy certificates, which the corporation will receive.[115] In this manner, the PPA represents the financial contract associated with a physical PPA but does not include the delivery of electricity.[116] In this case, each party will then enter into separate contracts for the purchase of electricity at a spot price.[117]

Thus, the agreement works more as a financial hedge. Such that if the spot price exceeds the PPA defined strike price, it is the generator who pays the excess amount to the off-taker for power produced in that period, and alternatively if the spot price for power is less than the strike price, the off-

108. Luther-Jones, *supra* note 97.
109. *Id*.
110. *What is a Sleeved PPA?*, *supra* note 104.
111. Gregus, *supra* note 101.
112. *Id*.
113. Luther-Jones, *supra* note 97.
114. *Id*.
115. Gregus, *supra* note 101.
116. Collell, *supra* note 98.
117. Luther-Jones, *supra* note 97.

taker pays the shortfall amount to the generator.[118] Therefore, "[the] corporation is not responsible for energy generation and also does not receive any electricity from developers," rather the virtual PPA "allows the corporation to catalyze the flow of electricity to the grid themselves without actually generating the energy."[119]

Essentially, the buyer will take the risk on what the wholesale market price will be at the time of purchase. This provides a safety net that if the market price is higher, the buyer will still get to obtain the fixed 'strike price', meaning they will pay lower than the market price.[120] However, the caveat is that if the market price is lower than the PPA fixed stick price, they are locked in for the higher fixed price.[121]

In deciding between the type of PPA to use, a corporation needs to weigh the location of the company and energy plant(s), accounting and fee structures, revenue available, credit, and the general risks associated for their company.

B. Renewable Energy PPAs

Renewable energy PPAs typically include provisions that do not generally apply to a traditional or fossil fuel-linked project. "The intermittency and seasonality of most renewable energy resources," and "the higher costs of electricity generated by renewable energy projects" pose just two concerns relating to renewable energy projects that must be taken into consideration in any type of energy transfer agreement.[122] As technology advances and prices for renewables decline, "in some markets renewable PPA prices are competitive with fossil fuel-fired projects."[123] Other factors attorneys must consider include the "environmental attributes and benefits of renewable energy," "federal and state tax incentives and credits that are available for renewable energy projects," and "the types of entities that enter into these agreements."[124]

In recent years, more C&I companies have been entering into PPAs to purchase power from wind and solar companies.[125] Generally, corporate PPAs "speed up deployment of renewable energy projects by securing a

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118. *Id*.
119. Gregus, *supra* note 101.
120. Collell, *supra* note 98.
121. *Id*.
122. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.
123. *Id*.
124. *Id*.
125. *Id*.

revenue stream for generated electricity and by easing access to project finance."[126] They also "provide access to corporate buyers, as an alternative to government-led auctions."[127]

These types of PPAs provide substantial benefits for both the corporate buyer and the energy developer. Namely, the buyer receives either a fixed electricity price or price cap, reduced risk mitigation for costs, does not take on operation risks, and progresses toward renewable energy/carbon reduction targets, which prove beneficial for recognition of renewable electricity achievements for the corporation.[128] For the developer or seller, corporate PPAs provide lower capital costs because of guaranteed purchase by the buyer, revenue diversification, and a stronger investment pipeline through corporate buyers.[129] PPAs also provide the seller with stable and long-term income through contracting with creditworthy corporate buyers allowing the seller to stay active in the development of sustainable energy systems.[130]

The primary benefit of PPAs, i.e., the ability to obtain electricity on demand for a fixed or cap fixed price as needed directly from the developer, might also be a limiting condition for using a PPA with a BESS. A BESS allows the buyer to store already purchased energy and use it as needed for operations. As these systems become more prevalent within energy contracts, legal professionals must look toward changing the traditional PPA to accommodate these types of variable changes. In seeking to secure optimum benefits for their respective clients, attorneys should attempt to incorporate appropriate provisions that help clarify the use of BESSs.

V. Adding a Battery Energy Storage System to a Power Purchase Agreements

The traditional *"locked price for as needed energy supply"* model PPA fails to cover the range of issues that arise from integrating BESSs into contractual agreements. Before starting the project, "a decision must be made on ownership, operation and financing of [this type of] equipment."[131]

126. *Corporate renewable power purchase agreements (PPAs)*, wbcsd (Nov. 12, 2019), https://www.wbcsd.org/Programs/Climate-and-Energy/Energy/REscale/Corporate-renewable-power-purchase-agreements-PPAs.

127. *Id*.

128. *Id*.

129. *Id*.

130. *Id*.

131. Jan Ahlen & Bob Gibson, *Battery Energy Storage Procurement Framework and Best Practice*, National Rural Electric Cooperative Association (June, 2021),

Attorneys are progressively seeing the shortcomings of using a traditional PPA to integrate the complexities associated with these storage systems. As they look toward additional provisions within the PPA or even alternative arrangements in conjunction with PPAs, they run into an unclear understanding as to how to correctly incorporate the battery storage systems within those documents. The following section provides an in-depth review of the various provisions that attorneys should consider when integrating a BESS into an energy purchasing agreement.

A. Operation and Ownership of the BESS

The greatest benefit of a BESS is that it can replenish itself from a renewable energy source and store that extra energy to be used when the renewable energy source is not available. However, in the actual operation of a BESS, it can be hard to clearly outline the risks and rewards associated with the BESS.

1. Setting General Terms of Use

First and foremost, the parties must decide upon the type of battery energy storage unit they will be utilizing. As previously discussed, the utilization of lithium-ion batteries is currently the popular form of battery storage. However, there are other types of BESS both in current operations and that are being developed. It is imperative that rather than just adding a BESS as another line in the agreement, the parties consider what specific type of BESS they will need to meet their needs.

Next, the parties must also determine whether they intend to use a physical PPA or virtual PPA. Although the virtual PPA model seems to be the best for renewable energy agreements, the physical model is still an option many employ. One thing to keep in mind is that with a physical PPA, an exchange in energy actually occurs. So, although integrating a BESS would reduce the variability of power issues with a physical PPA, it would still be important to determine who would control the BESS, the seller or the buyer. The parties need also clarify when the BESS would get replenished. Alternatively, under the virtual PPA, the parties enter into separate contracts for the purchase of electricity at spot prices, so the parties would need to consider how this spot price determination would be affected by a BESS that is storing spare energy.

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https://www.cooperative.com/programs-services/bts/Documents/Reports/Battery-Energy-Storage-Procurement-Guide-June-2021.pdf.

The parties must also determine where the storage system will be located. The energy industry continues to see a rise in co-located storage space "where the generating facility and storage are treated like two separate projects," where "the products from the storage system in these instances may be measured and paid for separately from energy sales."[132] These storage systems can "respond to grid needs relatively rapidly by charging to store excess energy or discharging to supply electricity."[133] In these cases, PPA drafting attorneys must consider "the extent to which the co-located systems should be treated separately or as one and what each party's attendant rights and obligations are with respect to each system."[134]

One primary shortcoming of the traditional PPA model, as it applies to a BESS is the lack of terms of use. Consider that "[some] forms of energy storage are considered to have a longer useful life than the related generating source."[135] Generally, the terms of use will be dependent upon the type of renewable energy source used for production and the type of use the parties hope to obtain from the renewable energy, i.e., use it to run an entire factory vs. just one small office space. These factors directly affect the size and capacity of the storage system.

Take, for example, a company that might want to fully convert to renewables as their only source of energy, so they would need a BESS that can match this need. However, "the developer [of the BESS] likely priced the use of the battery with specific charging and discharging limitations in mind, for example, that the maximum usage of the battery would include one full cycle per day and up to 365 per year."[136] In such instance, if the energy needed and the energy stored are not equal, that would be a direct conflict as to how and for what that BESS can be utilized. Without prior negotiations, the solution for a conflict like this would likely be to enter into separate agreements that would outline terms of use. But, if the developer has already built the BESS with limited use capacity, there are fewer remedial measures that can be taken. And the possible solution to this problem, such as replacing the entire BESS with a high-power one, would be much more expensive. To avoid these types of performance issues, specific guidelines should be outlined

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132. Caileen Gamache, *Energy storage: unique PPA considerations*, Norton Rose Fulbright Project Finance (Oct. 1, 2017), https://www.projectfinance.law/publications/2017/october/energy-storage-unique-ppa-considerations/.

133. *Id*.

134. *Id*.

135. Gamache, *supra* note 132.

136. *Clearer Expectations Over Energy Storage needed in Utility-Scale Project Contract Negotiations, supra* note 75.

within the purchasing agreement to ensure that all parties are aware of the terms of use for each BESS.

However, there is also the issue that at the time of sale, the buyer might not know exactly what type of unit they need or the amount of energy usage the party anticipates from the BESS. In these instances, attorneys must be critical in crafting agreements that provide optimum opportunity for modification of the purchasing agreements to accommodate changes.

Parties must also decide where the BESS should be located and clarify that within the agreement. Depending on the location of the BESS and what the Buyer intends to use the renewable energy for, some storage units may be combined with other units while some need to be left separate. Increasingly, storage facilities are being placed on-site at these corporation power plants so energy can be stored and supplied as needed, rather than the corporation seeking the energy directly from the developer. Therefore, "[a] PPA for a combined unit may require separate delivery terms for various products and services depending on which resource will be the predominant provider."[137]

The variation in terms makes it harder for a singular PPA to be utilized for all units involved. However, there are many ways attorneys can overcome these issues by clearly defining the exact terms of use between the parties. And if that is not possible or certain conditions are unforeseeable, drafters should be mindful to leave the PPA open for later negotiations on these issues.

2. Risk and Safety Considerations

Risk allocation is an important part of any agreement. Specifically, with a BESS, there are certain types of risks that parties should consider putting into writing. First, parties should determine what would happen if there was a defect with the actual battery system and who takes liability for these issues. For example, some battery storage systems are comprised of individual batteries which can be easily replaced so the unit can carry on. However other forms of storage do not have these capabilities. Some storage systems are comprised of *unproven technology*, "in that there has not yet been operating experience over the full life of a system and there are risks of the unknown."[138] These types of systems would make it more valuable for the buyer to enter into a short-term agreement with the seller, "with the option to renegotiate as the technology advances and more data on operations can be collected."[139]

137. Gamache, *supra* note 132.
138. *Id*.
139. *Id*.

BESSs also have additional safety requirements and provisions that need to be adhered to. As mentioned in section III, because of the nature of the BESS system, certain precautions must be taken for the safe utilization of these systems. This includes, but is not limited to, the battery systems being placed in separate rooms with correct temperature conditions away from heavy traffic and that any person interacting with these batteries take proper measures.[140] These types of issues should be addressed and recorded in some fashion to ensure that any risk related to battery safety is resolved adequately.

It is imperative that while drafting purchasing agreements, attorneys take into consideration any potential risks that could arise from the battery system and how these issues would be resolved between the parties. Although it is not possible to predict all issues, it is still possible to allocate certain risks. For example, the seller may take on the risk for the actual battery and any related defect, while the buyer can take on any risk that occurs at the actual site of placement or the buyer might take on pre-purchasing risk, while the seller takes on risk after the BESS has been placed. Or any such combination of risk allotment.

3. Expected Performance Outcomes and Scalability

Another obstacle with incorporating a BESS is determining the expected performance of the system. Sellers "may want to look to warranties to determine whether it has any recourse if the storage unit does not perform as anticipated" and because the technology is generally new, "it may be more challenging to guarantee performance as confidently as a seller may with another resource."[141] Further, all parties need to consider the effect that time will have on the battery system. Even with new technology and product types, a "battery storage system will typically degrade by some percentage each year until or unless the batteries are replaced," while some "factors may accelerate degradation, and it may be prudent to pre-assign liability if any of these factors occurs."[142] Additionally, the parties "will need to account for natural degradation in negotiating any performance guarantees, as well as the overall term of the PPA," with further consideration given to "how the reduced performance of the storage unit may affect or correlate to the performance of any co-located generating resources."[143]

Practitioners need also consider project scalability. Scalability assesses "whether a source of energy can be efficiently scaled up to a useful size or

140. Jewell, *supra* note 65.
141. Gamache, *supra* note 132.
142. *Id*.
143. *Id*.

percentage of the energy sector."[144] Since "many renewable energy projects (for example, wind and solar) cover a large geographic area," it is possible "for these projects to achieve commercial operation and be connected to the power grid in stages."[145] For example, in a wind farm, the commercial operation standard can be attained once a certain number of wind turbines are connected to energy grids.[146] Scalability "gives a seller the flexibility to begin commercial operation at less than the installed capacity, which can result in the project generating revenues earlier in its life cycle."[147]

If scalability is possible or even foreseeable in a renewable project, the parties must consider several additional issues. Some of these issues include the date by which the seller must complete the entire project and generate the capacity required under the agreement, as well as if and to what extent the seller will be compensated for delivering partial capacity.[148] Additionally to "the circumstances that typically excuse a delay in achieving commercial operations, the parties should consider the availability of the renewable energy resource and any interconnection issues that may arise which may have an impact on this schedule."[149] The parties should also take into account how delivery of partial capacity will affect the buyer's obligation or benefits under the PPA and if it does affect any of those obligations, what the alternatives or repercussions of these changes would be. With so much variability in performance outcomes, these issues must be negotiated ahead of any final agreement.

4. Controlling Rights on the BESS

Beyond potential performance issues of a BESS, the parties need also determine which party has control rights over the BESS. For instance, "the buyer may want to deploy the system to reduce energy costs during peak hours or use it as a demand-response resource," while the seller "might also want to use the system to meet load obligations or to balance a distribution system that it operates."[150] Within the purchase agreement, parties would need to integrate a working model of who dominates certain controls of the system

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144. Robert P. Smith, *Is Renewable Energy Viable* (last visited Feb. 12, 2022), https://cob.unt.edu/sites/default/files/docs/news/SMITH-Is%20Renewable%20Energy%20Viable-FINAL.pdf.

145. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.

146. *Id*.

147. *Id*.

148. *Id*.

149. *Id*.

150. Gamache, *supra* note 132.

and methods of use in order to effectively utilize the system between the two parties. Some items to consider would include "whether control will be on-site or remote, and what authority the other parties to the PPA have to step in are all key to this analysis," as well as "liability, maintenance, and compliance with permits and other regulatory obligations."[151]

5. Termination Conditions

The parties should also determine what happens to the BESS at the termination of the agreement. They should stipulate who gets the BESS at the end or if the BESS is simply destroyed or recycled. Although the determination of this might be dependent on external factors, such as the physical condition of the BESS at the termination date, the parties should still allocate responsibility between themselves as to who will determine what happens to the BESS.

Some battery storage units are mobile and can be moved from one place to another, and therefore still be utilized in a different area, so that is another factor for the parties to consider in their stipulation. For example, "the seller may want the right to leave the equipment in place and sell products and services to a nearby third party or market in an event of offtaker default or an extended *force majeure* event."[152] In these instances, it creates a line of liability between the buyer, seller, and any potential third party. To avoid any later issues that might arise from a seller *going off the path* and utilizing the BESS in a manner not specified by the agreement, controlling rights of the BESS must be specified, as well as any right that a party might have to contract with a third-party.

Another important issue arising out of the traditional PPA agreement is the typical 10-15+ year term usage and the expectations at the end of this long period. "Many PPAs include purchase options at set times and upon termination of the PPA," and while the "purchase option is usually at fair market value at time of purchase," it might be "difficult to predict the future value of unproven technology."[153] Therefore, "it may be necessary to include certain floor prices for the system that ensure the seller can satisfy any debt obligations in the course of selling the facility."[154] Both parties need to be aware of what is to occur to the BESS at the termination of the agreement or at least must have built-in flexibility with the PPA for effective termination.

151. *Id*.
152. *Id*.
153. *Id*.
154. *Id*.

6. Maintenance Obligations

In determining obligations, the parties need also consider which party is responsible for maintaining the system to comply with the manufacturer's operating requirements for the storage system.[155] Depending on the location of the BESS, the maintenance of the system might automatically fall on one party. However, the parties should consider which party will perform uptake and maintenance activities on the system to ensure that it meets its required function capabilities.

The PPA should also specify charging parameters, specifically for times when it becomes impossible for the battery to charge. Although the biggest benefit is that the BESSs recharge and then store energy in instances when the renewable resource is unavailable, there should still be a safety net built in for instances where all the stored power is used, and the renewable resources are still not attainable. "A concentrating solar power project, for example, should factor in the risk of reduced sunlight available to charge the storage unit."[156] Parties should build in provisions for "performance guarantees, force majeure events, and default provisions" to avoid later repercussions of these issues if such events occur.[157]

One way to divide the operating obligations is that "if the system is [a simple] PPA, the supplier will be responsible for operating and maintaining the system to meet specific performance goals."[158] Another option is:

> if the site will be owned by the [buyer], there are a couple of choices – the [buyer] could sign an [Operations and Maintenance] O&M contract with the supplier to provide for all maintenance, or the [buyer] could receive training in general operation and maintenance, with an option to access the supplier for non-standard situations.[159]

Alternatively, "[a] hybrid option is to contract for O&M program for the first year, with training included, then take over O&M after the [buyer] is trained."[160] In order for the BESS to operate and effectively perform its job, the parties need to consider what party is doing the proper maintenance of the facility to allow for operations to continue.

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155. *Id*.
156. *Id*.
157. *Id*.
158. Ahlen & Gibson, *supra* note 131.
159. *Id*.
160. *Id*.

B. Financial Considerations

Financial Risk is incredibly important to consider. For example:

> [w]hen you put the debt [accumulated by a buyer for a renewable energy project] against [a 25-year contract], then you can actually amortize the debt over a 25 year period, which makes . . . the economics of the equity more interesting, because [the buyer] can spread the debt over a longer period.[161]

However, "[w]ith the PPAs that might only be 15 years or shorter – the corporate PPAs – they probably would still want to have 25-year debt, but that debt is exposed to that reconstruction risk."[162] Buyers must keep in mind that the long-term financial benefits gained from using a PPA-type agreement would be relatively unattainable in shorter-term agreements. All parties must consider how adding a BESS to these types of agreements might affect the future of their respective companies. Although we remain optimistic about the future of BESSs within the renewable energy sector, they are still new technology, so the financial gains and losses need to be properly weighed before jumping into any agreements.

Beyond just the operation of the batteries, the parties must consider costs associated with incorporating the BESS. Typically, these costs can be separated into preliminary costs of financing the project, then maintenance costs of the BESS, and closing costs, along with any unforeseen costs that could arise throughout the period of usage.

1. Financing the BESS

Traditionally, the developer or seller is the one that burdens the cost of financing, however with changing conditions and adding equipment such as a BESS, the financing might be allocated to either party. "In order to finance the battery, a developer must price it appropriately," which normally means being able to predict how long the battery itself will last.[163] Prior to entering into a PPA, there are several costs associated with storage systems that parties should consider. This includes "whether the PPA price will justify the cost of construction and operation of the BESS," what happens if the cost of construction changes by the time purchase orders are submitted, or even whether the PPA can be changed or construction delayed if it becomes

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161. *Power of the PPA: the risks and rewards of buying energy at source, supra* note 94.

162. *Id*.

163. *Clearer Expectations Over Energy Storage needed in Utility-Scale Project Contract Negotiations, supra* note 75.

difficult or more expensive to procure needed supplies/materials.[164] Parties should also consider whether the system will receive any federal or state funding and if so, then there will likely be compliance requirements that the parties must satisfy.[165] Parties should consider negotiating all upfront costs prior to entering a PPA to ensure that no one party ends up footing the bill or such issues lead to later conflict or litigation.

Additionally, in complying with government law and regulatory recommendations, the parties and the PPA itself need to be adaptable to changing laws. Preliminary, the parties must investigate "permitting requirements . . . [since] battery energy storage is a new and rapidly developing technology, it may not be familiar to local permitting authorities . . . and the initial reaction may be to impose severe restrictions."[166]

Currently, "there is a lack of clear precedent about how energy storage units are to be regulated under the Federal Power Act."[167] The Federal Energy Regulatory Commission, responsible for regulating the transmission and sale of electricity, "has taken steps to facilitate storage, including making it easier to interconnect storage systems," while also proposing market rules "to encourage storage, such as ensuring energy storage resources are eligible to provide all of the products they are capable of providing in organized wholesale markets."[168] Invariably, there will be "policy changes and changes in subsidies and incentives for both energy storage and any co-located generating facilities," and so "it is especially important for energy storage PPAs to address what happens if a revenue stream develops or goes away during the term, and which party has the risk or benefit related to such changes."[169] The general lack of regulations can force any type of contractual agreement to be amendable to new regulations and parties should be mindful that as more laws are implemented to govern the renewable sphere, the standard purchase agreement would need to be malleable to potential changes.

2. Revenue Claims

By contract, parties must also determine revenue claims. "In some instances, PPAs contemplate splitting any increases in value stemming from new products or incentives," while in others, "PPAs simply let the party

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164. Gamache, *supra* note 132.
165. *Id*.
166. Ahlen & Gibson, *supra* note 131.
167. *Id*.
168. *Id*.
169. *Id*.

claiming the new attribute also claim all of the additional revenue."[170] Depending on the type of PPA and terms negotiated at the beginning of the transaction, some "bring the parties back to the negotiating table to reform the contract in the event there is a change of law that reduces the value of the product, especially when a substantial portion of the PPA value is at stake."[171] In the case of a BESS associated with the PPA, the variance in revenue is much greater, especially because the stored energy can be sold as a source of additional income. Before entering into an agreement, the parties need to objectively consider all possible sources of revenue from the BESS and integrate the allocation of such revenue within the PPA. They would also need to build in flexibility within the agreement as to the possibility that the revenue stream could substantially change.

3. Ongoing Expenses

There is an abundance of costs that can arise during financing for such a project. Both parties should work together to allocate the unknown financial expenses to the proper party to avoid later disputes. One way this can be done is to divide the unknown expenses into categories, for example, the seller could take on all unknown finances with supplying the BESS, while the buyer could take on any financial costs that arise from the utilization of the BESS, or in what other method they choose to split this risk.

Although many ongoing expenses are non-foreseeable, certain expenses are predictable and should be considered by each party before entering the PPA. For example, virtual PPAs pose an additional risk when the power is spread across a greater area of land. It exposes the buyer to *basis risk*, "where power gets produced, supplied, and consumed in different markets, with different energy prices and economic environments."[172]

Before delving into the contractual agreement, the seller should also be aware of the price variation it might experience, and the parties should incorporate specific provisions on how to equal out the variance in pricing at each location that they intend to deliver the power to. Alternatively, parties must also consider the potential revenue that could be grossed at the energy distribution locations and how that would get split among the parties. With the integration of a BESS, they must also consider where stored power will be supplied too and at what rate.

170. *Id*.
171. *Id*.
172. *Power of the PPA: the risks and rewards of buying energy at source*, *supra* note 94.

Additionally, "it is good practice to have a reserve fund for removal of equipment at the end of its service life, especially if hazardous materials are involved."[173] As previously discussed, the parties should have a termination clause that outlines what will occur to the BESS at the end of the PPA. In following this, they should also have reserve funding to properly carry out those termination actions. A recycling requirement is also effective to minimize damaging effects on the environment, however, the parties would need to keep in mind that "[recycling] requirements are evolving rapidly and will be substantially different in the years when many current systems will reach end of life.[174] End-of-term conditions such as removal or potential ongoing usage of the system are considerations for both parties. And even if they choose to leave termination terms open-ended, they should ensure that their PPA allows for later determination and allocation of end of usage funding.

4. Government Incentives

A major incentive for corporations to enter renewable energy PPAs, *besides their passion to save the planet*, are the tax incentives that it provides. Because of the importance of these tax credits to the financial stability of energy projects, renewable energy PPAs should include provisions that outline the financial risks and benefits associated that buyers could ascertain when they apply for such credits. For PTC credited projects, the PPA may include provisions "that compensate the seller for the value of any credits lost because the buyer did not purchase the required amount of electricity."[175] Additionally, under federal tax laws and IRS (Internal Revenue Service) regulations, "a buyer may be considered the tax owner of the plant if the term of the agreement exceeds 80% of the project's useful life," simply, "because the ITC and the PTC can generally only [to] be claimed by the tax owner of the project, the term of the PPA must be calculated to not exceed this period because the loss of these credits could have an adverse impact on the project."[176] In conditions where the project exceeds 80% or the outlined percent in the regulation, important discretion needs to be given so that the correct party receives the legislative incentives.

173. Ahlen & Gibson, *supra* note 131.
174. *Id*.
175. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.
176. *Id*.

PPAs must also take into consideration renewable energy certificates (RECs). RECs "give companies, institutions, and individuals a simple way to offset their carbon footprint and support clean energy," as "[p]urchasing RECs is equivalent to purchasing renewable energy."[177] Due to the energy entering the grid from many sources "there is no way to know exactly where [the] electricity is coming from," however, "RECs always come from renewable energy, so buying them allows you to claim the renewable energy attributes of that electricity."[178] Simply, if a company buys RECs, it can claim that its energy consumption comes from renewable sources. RECs represent the environmental attributes of a renewable energy project (for example, wind, solar and geothermal), "[generally], each megawatt hour (MWh) of electricity produced by a qualifying renewable energy project generally generates one REC."[179]

If parties are entering into an agreement that utilizes RECs to declare renewable energy credits, for governmental incentives or otherwise, the PPA associated with the transaction must make clear the guidelines with which those credits should be given.

Another provision parties should consider is whether the contracted price includes the value of the RECs or if the RECs are sold separately under the PPA or a different separate REC sale agreement.[180] They might also have the option to retain the full value of the RECs, however "[s]ome states allow RECs to be sold separately or unbundled from the electricity being sold, while other states require that the RECs be transferred to the purchasing utility."[181] To meet obligations under their state's renewable portfolio standard, parties should attempt to purchase the RECs either separately or as part of the contract price, "[h]owever, if there is a market for trading RECs and the seller thinks it can fetch a higher price by selling the RECs separately from the electricity, the seller may prefer to sell these RECs separately in the open market."[182] RECs can play an important role in why many companies are turning toward green energy, so their proper allocation is imperative to the correct distribution of benefits.

177. *Benefits of renewable energy certificates*, EnergySage (June 7, 2019), https://www.energysage.com/other-clean-options/renewable-energy-credits-recs/benefits-renewable-energy-certificates/.

178. *Id*.

179. *Introduction to Renewable Energy Power Purchase Agreements*, *supra* note 20.

180. *Id*.

181. *Id*.

182. *Id*.

C. The Alternative Method

Taking into consideration the various implications of integrating a BESS into the traditional PPA, parties might want to consider alternative methods to adding a BESS. One method would be negotiating an entirely separate contract that entails all the details of the BESS facility and acknowledges the aforementioned issues. This would allow the parties to separate the power purchasing agreements from the BESS, thereby reducing the overlap of conflicting issues between the two. A buyer might choose to buy the BESS from a different company than it buys the energy from. Alternatively, they might want to add in a BESS after entering the PPA. Establishing a separate agreement to monitor the terms of the BESS would create more flexibility for the parties.

Another method of providing the parties with flexibility would be to add the BESS into the PPA but keep the gate open to make alterations to the agreement as needed to accommodate the BESS. In this manner, as the seller and buyer determine, for example, who will be financing what part and how revenue will be allocated, they might make amendments to the original PPA to accommodate these changes.

V. Conclusion

This article attempted to touch on several additional provisions that attorneys and parties to a renewable energy PPA that is integrating a BESS need to consider. In no way was this list exhaustive of all potential considerations, however, it showcases the high points that any attorney should deliberate over, rather than just adding the BESS as another line in the budget sheet.

As the need for battery storage for renewable energy continues to rise, the prevalence of battery energy storage system provisions is becoming a norm within purchasing agreements. However, this “steady increase in the demand for renewable energy requires alternatives to the customized traditional 20-year [PPA] to meet delivery requirements.”[183] To effectively meet the demand for a more nuanced energy agreement, practitioners should look toward “alternative contract forms, shorter contract periods, risk shifting” and other alternatives that would be mutually beneficial to the

183. Meredith Hiller & Stephan Humes, *Nontraditional Offtake Strategies for Renewable Energy: Avoiding Landmines in Contract Structuring and Financing*, Strafford (July 16, 2019), https://www.straffordpub.com/products/nontraditional-offtake-strategies-for-renewable-energy-avoiding-landmines-in-contract-structuring-and-financing-2019-07-16.

energy company and the purchaser, while ensuring revenue is still possible for the project.[184] In becoming effective counsel, attorneys must learn the nuances of these contract structures to ensure efficient approaches to integrating battery energy storage systems into renewable energy power purchase agreements.

184. *Id.*